ROUTE 206 RARITAN RIVER BRIDGE
(Structure No. 1810170)
U.S. Route 206
over the Raritan River
Somerville vicinity
Somerset County
New Jersey

HAER No. NJ-130

HAER
NJ
18-SOMVI.V,
4-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, PA 19106

HISTORIC AMERICAN ENGINEERING RECORD

HAER
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ROUTE 206 RARITAN RIVER BRIDGE
(Structure No. 1810170)

HAER No. NJ-130

LOCATION: U.S. Route 206 over the Raritan River, Somerville vicinity, Somerset County, New Jersey

USGS Bound Brook, NJ Quadrangle
UTM Coordinates: 18.532465.4489320

DATE OF CONSTRUCTION: 1929

ENGINEERS: Morris Goodkind, Chief Bridge Engineer, W.F. Hunter, Bridge Engineer, Arthur G. Lichtenberg, Architectural Detailer, New Jersey State Highway Department

CONTRACTORS: Edward H. Ellis Company, Westville, New Jersey

BUILDER: New Jersey State Highway Department

PRESENT OWNER: New Jersey Department of Transportation

PRESENT USE: Vehicular bridge

SIGNIFICANCE: The Route 206 Raritan River Bridge is a well-preserved example of a concrete open-spandrel, barrel-arch bridge, representative of the early work of New Jersey State Highway Department Chief Bridge Engineer Morris Goodkind. Goodkind made important contributions to twentieth-century highway bridge engineering, particularly of concrete bridges.

PROJECT INFORMATION: The Route 206 Raritan River Bridge was recorded in January 1999 by the Cultural Resource Group of Louis Berger & Associates, Inc. (Berger), East Orange, New Jersey. The documentation, prepared for the New Jersey Department of Transportation (NJDOT), was undertaken in accordance with a Memorandum of Agreement among the New Jersey State Historic Preservation Officer, the Federal Highway Administration, and the Advisory Council on Historic Preservation.

Richard M. Casella, Senior Architectural Historian
Louis Berger & Associates, Inc.
120 Halsted Street
East Orange, New Jersey 07019

DESCRIPTION

The Route 206 Raritan River Bridge is a four-span reinforced concrete bridge of open-spandrel barrel-arch construction. The bridge is 382' in length overall and carries four 10'-wide travel lanes of U.S. Route 206 in a north-south direction over the Raritan River. The two center spans of the bridge are each 100' in length and span the channel at a height of approximately 26' above the average water elevation. The two side spans are each 80' in length and cross the floodplains. The bridge is 54'-10" wide to the outside of the railings, and 62' wide to the outside of the piers and refuge bays. Sidewalks measuring 6' wide are located on each side of the bridge. The bridge is bounded on all sides by woods belonging to the Duke Estate, a property that has been determined eligible for listing in the National Register of Historic Places.

The arches, or arch rings, are solid or barrel-type, elliptical in shape with a rise of 14'-6". The arch rings taper in thickness: the 100' spans taper from 3'-0" at the spring point to 2'-0" at the crown; the 80' spans taper from 2'-6" to 1'-9".

The arch spandrels are open and the concrete deck is supported by continuous transverse cross walls 1'-0" thick resting on the arch ring. The open-spandrel design reduces the overall dead load of the bridge, allowing lighter piers, abutments, and footings. The cross walls are spaced 7' apart on the 80' spans and 9' apart on the 100' spans. The deck slab in the center section of each span is supported by solid fill retained by cross walls and short spandrel walls. The filled section is 40' in length on the 100' spans and 35' in length on the 80' spans.

The bridge piers are hollow, box-type, detailed with shallowly recessed bush-hammered panels. The river piers sit atop bull-nosed pedestals. The piers extend 4' beyond the railings to support "refuge bays" consisting of a small seating area with concrete benches. The end piers at the abutments feature decorative concrete pylons 16' in height with recessed bush-hammered panels. The pylons are rectangular in section, tapering to a flat top trimmed with crown moulding. The U-type reinforced concrete abutments are decorated with horizontal beveled scoring.

The bridge railings are concrete, 3'-6" high with 5"x26" arched openings. The railings are supported by heavy posts with inset bush-hammered panels. Original plans indicate that lantern-style lighting fixtures were mounted on brackets attached to the pylons at each end of the bridge, and atop metal posts above each pier. The original lighting fixtures have been replaced with aluminum "cobra-type" light posts.

HISTORICAL BACKGROUND

European land acquisition and settlement in the general area of the Route 206 Raritan River Bridge began in the last two decades of the seventeenth century. The original landholders were primarily

English and Scottish gentlemen who resided in Britain but played an active role in the proprietary affairs of the area. The early settlers, however, were Dutch descendants who migrated from New York City, Long Island, and the Hudson Valley in search of land and agricultural opportunities.

By 1682-1683, the area had grown sufficiently in population to be part of the initial county division of East New Jersey, which placed the project area in what was then known as Middlesex County. Somerset County was formed out of Middlesex in 1688, but the present boundaries of Somerset County were not established until 1838. In 1745 the first municipal division of Somerset County occurred, dividing the county into Northern, Western, and Eastern precincts. In 1749, Bridgewater Township, which encompasses the project area, was formed from the Northern Precinct and incorporated in 1798 (Berger 1984). Somerville Town, within Bridgewater Township, was created in 1863. Somerville split from the township and was established as a borough in 1909 (Snyder 1969).

The region north of the Raritan River was settled by the 1680s. Colonists were attracted to the fine agricultural lands and the transportation advantages of the area. Although settlement began relatively late in Somerset County compared with other areas of New Jersey, it was one of the most densely populated counties by 1726 (Wacker 1975:145).

Initial settlement in the region was associated with navigable water routes. Roads were soon built, linking extant settlement nodes and stimulating additional migrations. The earliest roads, which tended to follow pre-existing Native American trails, linked the various Euroamerican settlements and reflect early settlement patterns.

The typical rural settlement pattern consisted of scattered farmsteads and various agricultural pursuits. In Somerset County, individual farmsteads first appeared in the Raritan and Millstone River valleys, and settlement spread south and west as the Euroamerican population increased during the remainder of the eighteenth century. The economic base of the area was agricultural, although there were also dispersed rural industries such as gristmills and sawmills for processing agricultural and forest products. Wheat, corn, oats, and hay were significant crops (Schmidt 1973:91-94).

As settlement of the region increased and the economy grew, the need to improve and build new roads also grew. An improved road system was vital in allowing the area's agricultural products to get to market and providing the necessary connections between the isolated farmsteads and surrounding areas (Berger 1984). The Princeton-Somerville Road (Route 206), on which the subject bridge is located, was established in 1811. The road crossed the Raritan River by way of a ford several hundred yards east of the present-day bridge. The road then ran north along what is now South Bridge Street and into Somerville (Berger 1984:41-42).

During the last decade of the eighteenth century and up until the 1840s, Somerville grew at a steady but slow pace. By 1834, the village contained two churches, an academy, a ladies' boarding school, three taverns, seven stores, a gristmill, and more than 100 houses (Gordon 1834:240). Two decades later, considerable change had come to the project area vicinity. Industrial and transportation developments contributed to the expansion of the village of Somerville; the primary factor was the construction in the 1840s of what became the main line of the Central Railroad of New Jersey (Jersey Central).

Somerville was a town of considerable size by this time and became one of Somerset County's leading governmental, religious, commercial, educational, industrial, and residential centers. All of these aspects were enhanced by the advantages conferred by the Jersey Central, which provided connections to New York City and points west. By 1852, the rail line had reached Easton, Pennsylvania. Connections were also made with the New Jersey Railroad at Elizabeth, which provided access to the Hudson River. In 1855, a connection was made with the Lehigh Valley Railroad in Easton, and two years later, with the Delaware, Lackawanna & Western at Hampton, New Jersey. It was now possible to ship coal quickly from the Pennsylvania coal fields to the homes and industries of New York and New Jersey, and mass-produced consumer goods flowed in the opposite direction.

By the end of the 1850s, Somerville had become an important stop on one of New Jersey's principal freight and passenger routes. The railroad attracted new commercial enterprises, and also made Somerville attractive to businessmen who wished to live in the suburbs while commuting to offices in Newark or New York (Heritage Studies 1992).

In subsequent decades, the expansion of the rail system throughout Somerset County altered the region's economic base. The railroad provided a means of transporting agricultural goods to distant markets, which resulted in an expansion of large-scale farming such as stock farms and large dairy farms. The railroad also opened the area to development, making it possible for the wealthy from New York City and Philadelphia to establish country homes in the region.

By the early twentieth century, Somerville had a population of about 6,000. While largely residential and commercial, the community did attract some industry by the turn of the century, including a carriage manufacturer, a shirt factory, and a large woolen mill. The surrounding Bridgewater Township was primarily rural, but copper mining, which had begun as early as the 1720s, continued to be a source of employment until about 1910. On the opposite side of the Raritan River, in Hillsborough, the H.W. Johns-Manville Company constructed a new plant in 1912. Within a decade, Johns-Manville had become the largest asbestos-producing company in the world.

By 1930 the population of Somerset County had reached 65,328, of which 8,230 resided in Somerville. The county was laced with a network of 800 miles of roads and the lines of five major railroads, including the Central Railroad of New Jersey, the Philadelphia and Reading, the Port Reading, the Baltimore and Ohio, and the Lehigh Valley Railroad (Somerset Press, Inc. 1938:6, 20).

The introduction of inexpensive mass-produced automobiles during the middle to late 1920s resulted in a crushing influx of traffic to New Jersey's road and highway system. The state highway department scrambled to catch up with the need for improved highways. The department's Annual Report for 1930 reported that

> the solution of the problem has called for wider and straighter roadways, by-passing centers of population, viaduct construction, railroad grade separations, highway grade separations, traffic circles and otherwise improved intersections, with provisions for proper interchange of traffic from one highway to another, improvement in alignment and grades, proper lighting at special locations, and proper directionary [*sic*] and cautionary signs. (New Jersey State Highway Department 1930:2)

Like the centers of many of the small New Jersey towns built around busy crossroads, downtown Somerville had become a bottleneck for traffic trying to pass through. In the mid-1920s the highway department planned a north-south highway, which would pass through Somerville and form a link in an interstate highway system agreed upon by Pennsylvania and New Jersey. The new road, to be designated Route 31, would follow the Somerville-Princeton Road, pass around the west side of Somerville on a new bypass road, and continue north to Bedminster following Route 16. A new section of highway would link Bedminster with Chester, passing through Peapack and Gladstone. Some portions of the Route 31 project were built, including the Somerville bypass section and the new concrete arch bridge over the Raritan River that is the subject of this study. Opposition to the project by Somerset and Morris County freeholders and citizens living along the proposed route led to the project's eventual cancellation by the New Jersey State Highway Commission (*Somerset Messenger* 1929a:3). The new highway was eventually built during the 1930s following a route that passed near, but not through, the villages of Peapack and Gladstone. In 1939 various sections of the road were designated Routes 202, 206, or 31, with overlapping sections carrying multiple Route designations (New Jersey State Highway Department 1939).

History of the Bridge

The Route 206 Raritan River Bridge was built in conjunction with the construction of a highway bypass around Somerville, known as the "Route 31-Section 4, Somerville By-pass." The project was described in the 1929 highway department report:

> This section extends from the existing concrete pavement on Route 31 at the north entrance to Duke's Park, thence crossing the Raritan River over a new concrete arch bridge, new bridge is about 200' westerly from the existing bridge, thence in a northwesterly direction crossing Flemington Branch of the Central Railroad of New Jersey at grade, thence across

> the meadow to Somerset Street, Raritan; a spur starting at the north end of the New Bridge connects with Bridge Street, Somerville, the existing Route 31. It is over new right-of-way, 80' wide and will by-pass the congested business district of Somerville. (New Jersey State Highway Department 1929:n.p.)

The project included the construction of the new bridge and 1.469 miles (including the bridge) of new macadam and asphalt roadway varying in width from 20' to 40'. The contract was awarded to the Edward H. Ellis Company of Westville, New Jersey, on June 25, 1929. The contract was signed July 1, and work began July 12, 1929. The contract price was $331,440.35, of which $211,225.97 was for construction of the bridge. The project was supervised by the Central Construction Division of the highway department under H.D. Robbins, Division Construction Engineer. The department's resident engineers for the project were L.T. McCormick and G.W. Widitus (New Jersey State Highway Department 1929:n.p.).

Less than two weeks into construction, on July 23, 1929, Peter Mahoney, a laborer, was caught in a cave and was severely injured. While Mahoney and five others were excavating the footing for a bridge pier on the south side of the stream, a section of the bank collapsed. All jumped clear except Mahoney, who was partly buried. He was dug loose and rushed to Somerset Hospital where it was determined that he had suffered broken ribs and internal injuries (*Somerset Messenger* 1929b:2).

The project called for substantial amounts of fill to be placed for the road as well as the approaches to the new bridge. An unusually rainy autumn in 1929 slowed the "placing of borrow." By the end of 1929 the bridge project was 65 percent complete, while the road section was only 30 percent complete. Work continued into the next year and was officially completed September 29, 1930 (New Jersey State Highway Department 1929:n.p., 1930:353).

The design of the Route 206 Raritan River Bridge was the direct responsibility of Morris Goodkind, chief engineer of the bridge division of the New Jersey State Highway Department, a position he had held since 1925. Goodkind was rapidly establishing himself as a leader in concrete arch bridge design. He had just completed (1929) the monumental "College Bridge" (since renamed the Morris Goodkind Bridge), a concrete multiple arch structure carrying U.S. Route 1 over the Raritan River. The bridge was attracting national attention and would win him several awards for its beauty and design. Goodkind's career is described in detail below.

In addition to the Route 206 Raritan River Bridge and the College Bridge, during 1929 and 1930 the bridge division was overseeing the construction of 142 other bridges. Goodkind supervised an average of 67 employees during 1930, including 15 bridge designers, three bridge detailers, four resident engineers, 11 draftsmen, 28 bridge inspectors, and several administrative personnel (New Jersey State Highway Department 1930:n.p.). Goodkind was directly assisted in the preparation of the plans and drawings for the Route 206 Raritan River Bridge by bridge engineer W.F. Hunter, architectural detailer Arthur G. Lichtenberg, and chief draftsman L.C. Petersen (New Jersey State Highway Department Bridge Division 1929).

Reinforced Concrete Open-Spandrel Arch Bridges

Although concrete as a structural material was used by engineers in ancient times, the first known concrete bridge built in the United States was the 1871 Prospect Park Bridge in Brooklyn, New York, a non-reinforced-concrete example. The early concrete bridges were arches, following the traditional design technologies of the earlier masonry arch bridges, which required the erection of a temporary structure and framework to hold and shape the liquid concrete prior to hardening (Plowden 1974:297 ff.).

Between 1880 and 1895, knowledge of this structural material improved as European engineers tested the capabilities of concrete reinforced with metal components to absorb tensile stresses. The first modern reinforced concrete bridges were built in France and Germany as early as 1867, in England in 1871, and in the United States in 1889. During the last decade of the nineteenth century construction of reinforced concrete bridges became widespread in the United States and abroad as engineers turned their attention to the potential advantages of the bridge type. Promoters of the use of concrete pointed to the longevity of concrete structures built by the Romans, and the fact that the structures were fireproof, rustproof, maintenance-free, low in cost, and built with locally available materials and labor (Herrold 1913:60; Marsh 1904:3; McKibben 1912:49-50).

In 1889, Ernest L. Ransome designed an early reinforced concrete arch for Golden Gate Park in San Francisco; this structure most likely incorporated twisted steel rod or bar reinforcement. Experimentation with metal reinforcement embedded in concrete continued into the early twentieth century. The predominant type of reinforcement for concrete bridges through the end of the nineteenth century, however, employed beams rather than bars. The Austrian engineer Joseph Melan patented a scheme for arched I-beam reinforcement in the United States in 1894. His scheme was later modified and patented by another Austrian engineer, Fritz von Emperger, who built a number of beam-reinforced arch bridges in the United States beginning in 1897 (Turneaure and Maurer 1932:2 ff.).

The most important American engineer to design and build reinforced concrete bridges during this period was Edwin Thacher. In 1889, with 20 years of iron and steel bridge building experience behind him, Thacher began building reinforced concrete bridges for southern railroads. In 1894, Thacher designed a five-span arch over the Kansas River at Topeka; at 693' it was the largest reinforced concrete bridge at the time and the first to utilize the elastic theory of arch design. This work established Thacher as the leader in the field (ASCE 1921:921; Buel 1904:215).

In 1895 the Austrian Society of Engineers and Architects published the results of five years of testing arches constructed of various materials including "concrete-steel," the first term used by engineers to describe reinforced concrete. Thacher considered the research to be the most valuable contribution to the theory and practice of arch construction ever made and immediately began using the data to further develop his bridge designs. Thacher published one of the earliest specifications for concrete-steel bridges in 1899, and patented a deformed reinforcing bar for concrete known as a "Thacher bar," a predecessor of the modern "rebar" (ASCE 1921:921; Thacher 1899:179-181).

It was soon recognized that beam reinforcement required a substantial amount of steel, and bar reinforcement began to be explored as a more efficient use of material. Reinforcement bars required less steel and were lighter than beams, and they could be bent and placed in regions of high tensile stress. By the early 1900s, various patented bar-reinforcement methods had been developed, each employing different shapes, patterns of surface deformation, and bending schemes. By the first decade of the twentieth century, reinforcing bars, or "rebars," had replaced beams as the preferred method of reinforcement (Taylor et al. 1928:452 ff.).

Public acceptance of structures once scorned as "mud bridges" followed quickly after the engineering profession gave its approval for the use of reinforced concrete in bridge building. Materials testing and the adoption of standards for reinforced concrete construction greatly facilitated its popularity. Between 1903 and 1916, the American Concrete Institute and the American Society of Civil Engineers Committee on Reinforced Concrete Highway Bridges and Culverts developed bridge classifications and appropriate load formulae for bridge design (Hool and Kinne 1924:446 ff.). Municipal highway departments, already engaged in standardization of contracting and construction, welcomed these specifications and results. By 1917, bridge historian J.A.L. Waddell asserted that for short-span city bridges, the use of reinforced concrete was nearly universal (Waddell 1916:783 ff.).

Another American engineer who made important contributions to the field of concrete bridges was Daniel B. Luten. In 1900 Luten formed a bridge engineering company in Indianapolis and quickly emerged as a leader in the development and application of short-span concrete arch highway bridges. According to the 1937 edition of *Who's Who in Engineering*, Luten held 52 patents on improvements in concrete bridge design, and was the author of 100 articles in the technical press and the designer of approximately 15,000 bridges in use at the time (Downs 1937:851).

Concrete arch bridges are classified into four categories based on the way the dead load of the structure is carried: filled-spandrel, closed-spandrel, open-spandrel, and through arches. The filled-spandrel arch consists of a barrel arch that carries filling material and terminates in closed longitudinal walls that act as retaining walls for the fill. Closed- and open-spandrel arches carry the traffic loads to the arch ribs and contain no fill. The former type carries the deck loads by spandrel walls resting on the arch ribs, whereas the latter type carries the roadway loads to the arch ribs by spandrel columns. Through arches, or "Rainbow" arches, consist of ribs that extend above the roadway and carry the deck loads by vertical hangers.

Initially, reinforced concrete arch bridges closely imitated the traditional, less-plastic stone masonry closed-spandrel barrel-arch bridges. However, as the structural advantages of reinforced concrete became apparent, the heavy filled barrel was lightened into ribs. This division of the arch barrel into ribs has been dated by historian Carl Condit to the 1898 small-span, two-ribbed highway bridges erected in Allegheny County, Pennsylvania, by F.W. Patterson, state Public Roads Department Engineer. These bridges employed the curved I-beam reinforcement that was predominant at the time. In 1896, Edwin Thacher patented a bridge design incorporating the basic elements of open-spandrel construction in vertical posts which carried deck loads to an arch rib. The open-spandrel walls not only gave the arch a lighter appearance, but also decreased the dead load, thereby allowing the concrete arch to be flatter and multi-centered, making longer spans possible. Designers were no longer limited to the semicircular or segmental arch form of the stone arch bridge (Turneaure and Maurer 1932:3).

By 1906, with the opening of Philadelphia's Walnut Lane open-spandrel arch, both the utility and the attractiveness of the bridge form for municipal arch bridges were securely established. Subsequent texts in the 1910-1930 period actively promoted the reinforced concrete, open-spandrel ribbed arch as an effective choice for city engineers. Henry G. Tyrrell's (1911) *History of Bridge Engineering* recommended open-spandrel bridges with projecting or cantilevered sidewalks in preference to solid-spandrel filled arches. In the same book, Tyrrell stated that "reinforced concrete bridges are extensively used in parks . . . where architectural treatment is desired" (Tyrrell 1911:410), and provided illustrations of numerous arch bridges in various urban settings. By 1928, the Taylor, Thompson, and Smulski handbook, *Concrete Plain, and Reinforced*, suggested use of open-spandrel arches where the ratio of rise to span was large and the spans were longer than 100' (Taylor et al. 1928:439).

The aesthetics of bridges designed for city park settings were addressed by engineers in the early twentieth century. In addition to the calculations for open-spandrel arches, Taylor, Thompson, and Smulski outlined the advantages of concrete arch construction in their handbook (Taylor et al. 1928). Permanency, small cost of upkeep, and reduction of vibration and noise are several of the benefits mentioned; however, the aesthetic appearance of the bridge is given primary importance. The authors state that "an arch bridge lends itself admirably to artistic treatment" because of the ability of concrete to form ornamentation. Reconciling the new bridge construction to its surroundings is listed as another advantage of concrete arch construction in that a bridge built in this design "may be fitted into a landscape without destroying any of its natural beauty" (Taylor et al. 1928:431).

Morris Goodkind

Morris Goodkind was born in New York City in 1888 and graduated from Columbia University in 1910 with a degree in civil engineering. Following graduation he worked with the City of New York Public Service Commission as a structural draftsman preparing plans for the city's subway system. After a year he moved to another city job as an instrument man on a survey team, which provided another year of experience in his field. In 1912, Goodkind joined the private engineering firm of Albert Lucius as an assistant engineer. Albert Lucius (1844-1929) was a German engineer who had immigrated to the United States in 1865 and settled in New York. He designed the elevated railway systems for New York City and Brooklyn, and in 1886 started a private consulting practice in New York City. Lucius specialized in bridges and designed several notable structures for railroad companies. Goodkind worked in Lucius's office between 1912 and 1914, and it was undoubtedly here that his interest and skills in bridge design were honed (American Society of Civil Engineers [ASCE] 1930:1565-1566).

During his early career years Goodkind moved rapidly from job to job, gaining experience and jumping back and forth between the public and private sectors. Between 1914 and 1918 he worked as a structural designer for the Interboro Rapid Transit Corporation. This was followed by a one-year stint with the J.G. White Engineering Corporation. In 1919 he went back to public service as bridge engineer for Mercer County, New Jersey. It would be 36 years before Goodkind would again work in the private sector (Downs 1948:751).

Goodkind joined the New Jersey Highway Department in 1922 as general supervisor of bridges and was named chief bridge engineer in 1925, a position he held until his retirement in 1955. He received numerous awards for his work over the course of his career with the state. His most prestigious award was the Phoebe Hobson Fowler Medal, given by the American Society of Civil Engineers for his design of the College Bridge, a multi-span concrete arch carrying U.S. Route 1 over the Raritan River. This bridge has since been renamed the Morris Goodkind Memorial Bridge (Downs 1948:751).

Goodkind also won awards for the aesthetic design of his bridges, given annually by the American Institute of Steel Construction (AISC). Three bridges designed by Goodkind won "most architecturally beautiful bridge" of the year awards in their category: the Oceanic Bridge over the Navesink River (1940); the Passaic River Bridge between Newark and Kearney (1941); and the Absecon Boulevard Bridge in Atlantic City (1946). The Cheesequake Creek Bridge on Route 35 between Sayreville and Madison (1943) won an honorable mention (*New Brunswick Daily Home News* 1968:1, 12).

During World War II, Goodkind served as a consultant to the War Department, aiding the Army Corps of Engineers in the design and construction of bridges in Europe and elsewhere. While working in Washington during the war, he met a Chinese engineer at a YMCA where they were both staying. At the time, Goodkind and his fellow Corpsmen were in charge of designing bridges along the Burma Road and were frustrated by their inability to get accurate Allied intelligence about suitable bridge sites. After hearing of the dilemma, the Chinese engineer pulled out a collection of detailed drawings, photographs, and notes of possible bridge sites, information that he had collected in a survey of the proposed highway before the war (*New Brunswick Daily Home News* 1968:12).

Goodkind was awarded the Tau Beta Pi Achievement Certificate from Rutgers University in 1948, an honorary doctor of engineering degree from Newark College of Engineering in 1950, and the Egelston Medal from Columbia University — the highest award given by Columbia for engineering achievements — in 1958. Following his retirement from the State Highway Department in 1955, he became a partner in the engineering firm of Goodkind and O'Dea, which remains in business today. Morris Goodkind died September 5, 1968 (*New York Times* 1968:8).

SOURCES OF INFORMATION/BIBLIOGRAPHY

A. Engineering Drawings:

Original engineering drawings are located at the New Jersey Department of Transportation, Trenton, and are presented in the photographic documentation section of this report.

B. Historic Views:

Historic views of the bridge located for this report consist of three views taken by the New Jersey State Highway Department upon completion of the bridge. The original photographs are located in the New Jersey State Archives, Trenton. The three original photographs also appear in the New Jersey State Highway Department Annual Report, 1930, located in the New Jersey State Library, Trenton. Photocopies of the three views are included in the supplemental documentation section of this report.

C. Interviews: None

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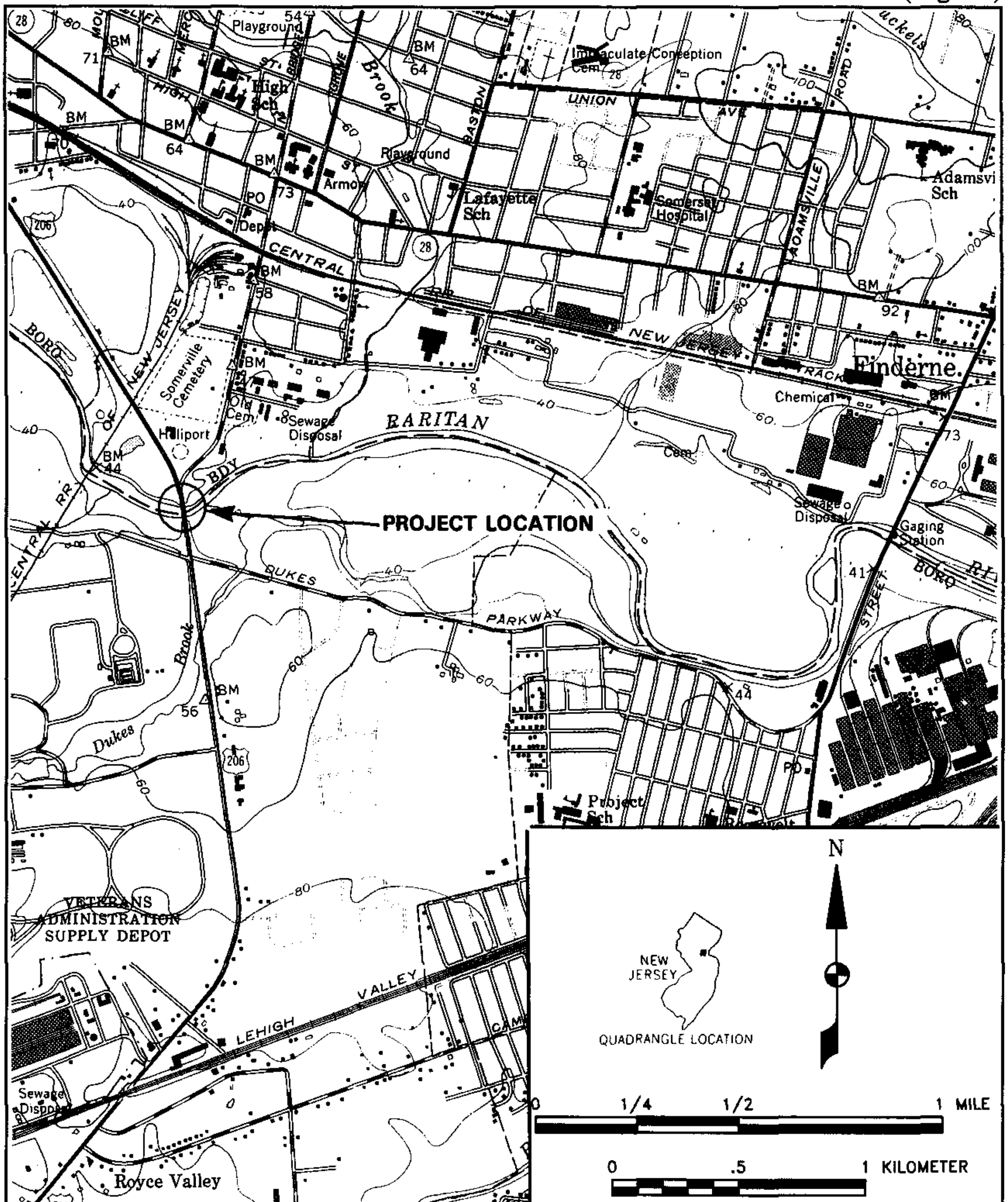
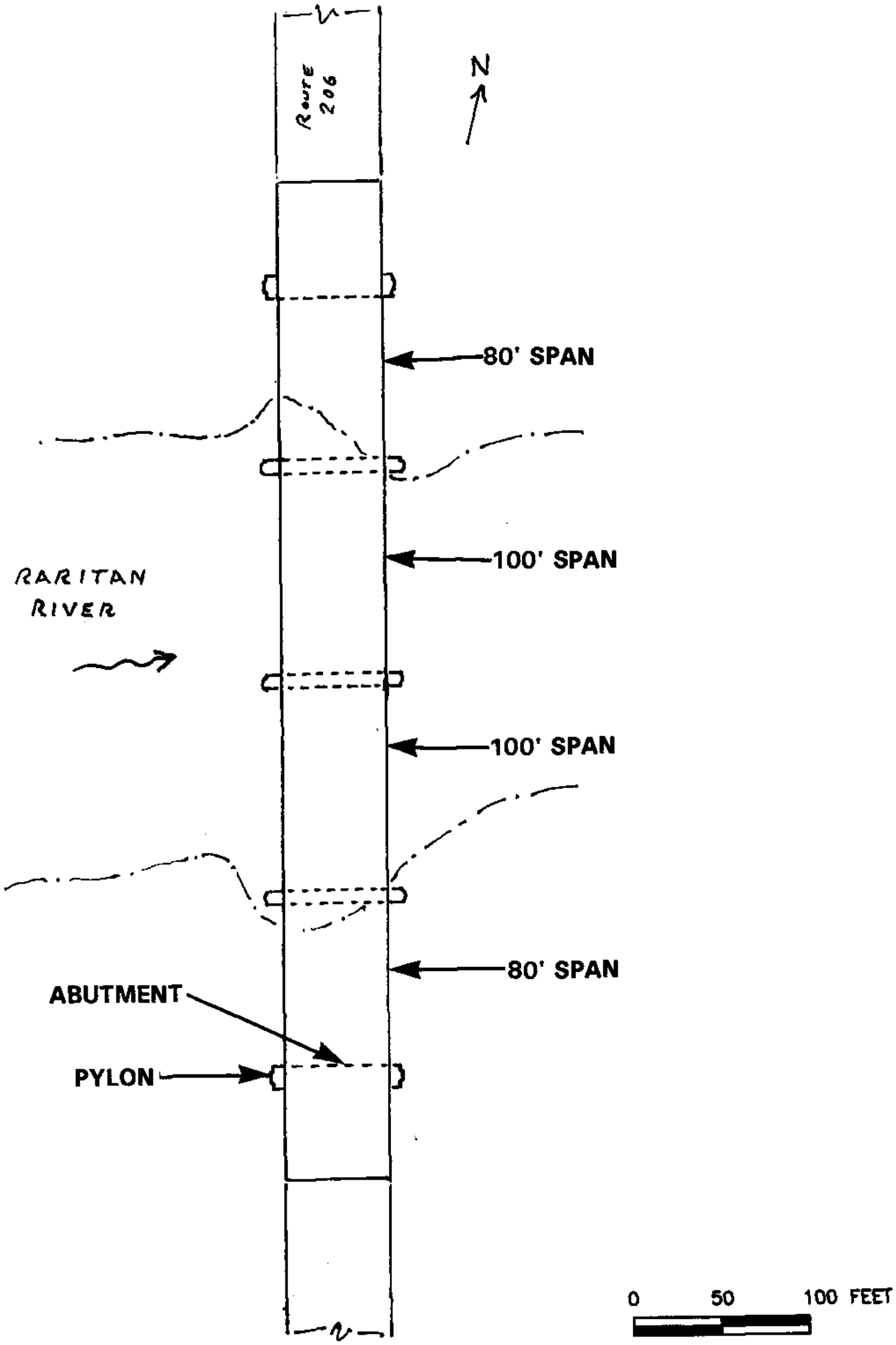
E. Likely sources not yet investigated: None known.

F. Supplemental Material: Location Map, Site Sketch, and Photocopies of three historic photographs, as described above.



Location Map

SOURCE: USGS 7.5 Minute Series, Bound Brook, NJ Quadrangle 1955 (Photorevised 1970, Photoinspected 1977)


ROUTE 206
N
80' SPAN
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100' SPAN
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ABUTMENT
PYLON
0 50 100 FEET

Site Sketch